

EXHIBIT A

An Analysis of the Effects of North Dakota's Voter Identification Law On Potential White and Native American Voters

Dr. Gerald R. Webster
Laramie, Wyoming

1. INTRODUCTION

1. I am a Professor of geography at the University of Wyoming, Laramie, Wyoming. I have been employed at Wyoming since August 2007, and served as departmental chair from that time until August 2015. Prior to assuming my current position at Wyoming, I was a faculty member in the Department of Geography at the University of Alabama for eighteen years, serving as departmental chair the last seven.

2. My formal education includes a BA (1975) in political science from the University of Colorado-Denver, a MS (1980) in geography from Western Washington University, and a Ph.D. (1984) in geography from the University of Kentucky.

3. My primary research and teaching emphases are in political geography. I have published over 80 articles in refereed journals, book chapters, and edited volumes. In 2011, I was given the Lifetime Achievement Award by the Southeastern Division of the Association of American Geographers, and in 2012 I was selected to provide the Political Geography Plenary Lecture at the Association of American Geographers meeting. I have provided written reports, oral testimony, or both in litigation in eleven states. Most recently I provided expert reports and trial testimony in *Veasey v. Perry*, No. 2:13-CV-193 (S.D. Tex.) and *United States v. State of North Carolina*, No. 1:13-CV-861 (M.D. North Carolina). My Curriculum Vita accompanies this report (Appendix 1). My rate of compensation is \$200 per hour.

4. I have been asked by the Native American Rights Fund (NARF) to determine if North Dakota's voter identification law poses differential obstacles for potential White and

Native American voters. I have been specifically asked to assess whether the obstacles associated with obtaining appropriate identification at a state Driver's License Site differ for White and Native American North Dakotans due to contrasting residential patterns, levels of access to a motor vehicle, and levels of poverty.

5. To complete this report, data were examined from the 2000 and 2010 United States censuses, and the 2006-2010 and 2009-2013 American Community Survey (ACS) Five-Year Estimates. In addition, data were collected regarding the locations of North Dakota Driver's License Sites where potential voters can secure appropriate identification to cast a valid in-person ballot. The location data for the driver's license sites were gathered from the North Dakota Department of Transportation website (<https://www.dot.nd.gov/divisions/driverslicense/docs/Drivers%20Lic%20Sites.pdf>).

6. This report relies upon different Census Bureau data sets due to the limitations of any individual data set. While the 2000 and 2010 censuses are intended as complete enumerations of the U.S. population, the 2010 census posed a reduced number of questions to respondents. To replace the data not collected due to shorter census forms, the American Community Survey (ACS) began collecting data in 2005 which is arranged in one, three and five year estimates (U.S. Census Bureau 2008). It is important to note that not all variables are available from the ACS at all geographic scales or in all time periods. While the ACS releases one, three and five year estimates, the five year estimates are the most reliable due to the larger number of cases surveyed during the time frame (U.S. Census Bureau, 2008: 9). This report therefore relies on variables from the most current five year ACS estimates available. For example, poverty rates for North Dakotan Native Americans and Whites are drawn from the 2009-2013 ACS Five Year estimates, but data on household access to a motor vehicle for both

North Dakotan Native Americans and Whites are drawn from the 2006-2010 ACS Five Year estimates because this variable is not broken down by the race of the household in more recent ACS releases. The principal variables drawn from the census at the county level are provided in Appendix 2.

7. Many of the calculations and all of the maps included in this report were made by the University of Alabama Cartographic Research Laboratory under my direction. I have employed the Laboratory for expert witness work since the mid-1990s and for academic research efforts since the late 1980s.

8. This report includes multiple sections. Immediately following is an “Executive Summary” stating the report’s primary general findings. The third section provides an overview of the demographic diversity and population growth rates in North Dakota. The fourth section briefly outlines the types of identification required to cast a valid in-person ballot in North Dakota. The fifth section discusses the costs associated with participating in the political system such as voting. The sixth section includes the methods and analysis used to determine if it will be more difficult for Native Americans who lack an appropriate identification to obtain one from a North Dakota Driver’s License Site when compared to Whites. The seventh and final section includes the report’s conclusions.

2. EXECUTIVE SUMMARY

9. Participation in the political system including voting has costs in terms of time and money, with higher costs leading to decreased rates of participation. Higher costs most affect the poor.

10. Native Americans in North Dakota have poverty rates nearly three times those of White residents, and Native American household units are twice as likely to not have access to a motor vehicle.

11. There are 27 sites where North Dakota residents can apply for a driver's license or non-driver's identification card spread across the state's 53 counties, or one for every 2,600 square miles of the state's area. The hours during which these outlets are open for business vary widely, with more than half open a few hours one or two days per month. The geographic distribution and hours open of the state's 27 Driver's License Sites may constitute significant obstacles for many potential voters.

12. On average, Native Americans in North Dakota must travel twice as far as White North Dakotans to visit a Driver's License Site. Distances can be particularly long for Native Americans living on one of the state's five reservations. These distances constitute a serious obstacle to participation in the electoral system, particularly when coupled with higher rates of poverty and greater rates of household units not having access to motor vehicles among Native Americans.

3. DEMOGRAPHIC OVERVIEW OF NORTH DAKOTA

13. The total population of the state of North Dakota was 672,591 in 2010, 30,395 or 4.7% larger than in 2000. Whites and Native Americans are the two largest demographic groups in North Dakota, jointly constituting nearly 95.5% of the state's total population. In total there were 605,499 Whites and 36,591 Native Americans enumerated in the 2010 Census (Table 1).

14. In 2000, 92.4% of North Dakota's residents were White (Table 1). This proportion fell to 90.0% in 2010. The Native American population was 4.9% of the state's total

population in 2000, rising to 5.4% of the total in 2010. The state's White population grew by 2.1% between 2000 and 2010, while during the same period its Native American population grew by nearly 17%.

Table 1: North Dakota Population Growth by Race, 2000-2010*

Group	2000	2010	Absolute Change	Percent Change
Whites	593,177 (92.4%)*	605,499 (90.0%)*	12,272	2.1%
Native Americans	31,329 (4.9%)*	36,591 (5.4%)*	5,262	16.8%

*Percent of total.

Source: Calculations from Census of Population 2000 and 2010.

15. According to the 2009-2013 Five Year ACS, North Dakota has nearly 525,673 residents who are both U.S. citizens and 18 years of age or older, the citizen voting-age population (CVAP) (Table 2). Whites constitute 92.5% of this group, and Native Americans 4.4%.

Table 2: U.S. Citizen Voting Age Population in North Dakota
by Race, 2009-2013

	CVAP Total	Percent of CVAP Total
Whites	486,332	92.5%
Native Americans	23,360	4.4%

Source: American Community Survey Five-Year Estimates 2009-2013, Table B05003.

16. The state of North Dakota has five Native American Reservations entirely or partially within its borders. These include Turtle Mountain which is entirely in Rolette County

in the north central portion of the state, Spirit Lake in the northeastern portion of the state which includes portions of Benson, Eddy, Ramsey (only 11 census blocks) and Nelson (only 3 census blocks) counties, Ft. Berthold which includes portions of McLean, Mercer, Dunn, McKenzie, Mountrail and Ward counties in the west central portion of the state, Standing Rock which straddles the North Dakota-South Dakota border and includes Sioux County, and Lake Traverse which also straddles the North Dakota-South Dakota border and includes small portions of Sargent and Richland counties (Figure 1).

17. Whites and Native Americans have different patterns of geographic distribution in North Dakota (Figures 2 and 3). While the White population is spread across the entire state with most counties being more than 95% White, there are three counties less than 50% White including Sioux, Rolette and Benson which are part of the Standing Rock, Turtle Mountain and Spirit Lake Reservations, respectively. Sioux County is 84% Native American, Rolette County is 78% Native American and Benson County is 55% Native American. Also of note is Mountrail County which is nearly 29% Native American and McKenzie County which is nearly 19% Native American. Both include portions of the Fort Berthold Reservation.

18. According to the 2009-2013 ACS Five Year Estimates, 11.9% of all residents of voting age in North Dakota had incomes below the poverty level during that period. (In 2012 the poverty income for a household of two with the householder under 65 years of age was \$15,450. For a family of four with two children under 18 years of age the level was \$23,283. See American Community Survey 2012: p. 27.) Rates of poverty for persons of voting age differed significantly between Native American and White North Dakotans. While 7.6% of voting age Whites in North Dakota had incomes below the poverty level, nearly 22% of Native Americans of voting age had incomes below the poverty level in 2009-2013 (Table 3). Thus, the poverty

rate for Native Americans of voting age is nearly three times that for Whites of voting age in North Dakota.

Table 3: Selected Statewide Statistics by Race

	Voting Age Poverty Rate, 2009- 2013	Percent Household Units without Vehicle Access, 2006-2010
Whites	7.6%	4.8%
Native Americans	21.7%	10.5%

Source: American Community Survey Five-Year Estimates 2006-2010, Tables B25044 and American Community Survey Five Year Estimates, 2009-2013, Table B17001.

19. The counties with the highest rates of voting age poverty in North Dakota are spread across the state, but there is a geographic association between counties with larger proportions of Native Americans and higher rates of poverty (Figure 4). For example, the counties with the highest voting age poverty rates are Sioux (40.5%), Rolette (36.0%), and Benson (35.8%) with no other county in North Dakota having a poverty rate of 25% or more. These three counties are 83.6%, 77.8% and 54.9% Native American, respectively. The additional five counties more than 5% Native American including Mountrail (28.8%), McKenzie (18.9%), Dunn (8.9%), Ramsey (7.7%) and McLean (7.3%) all have voting age poverty rates of over 10%.

Figure 1
Native American Reservations in North Dakota

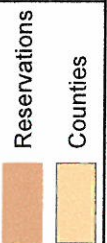
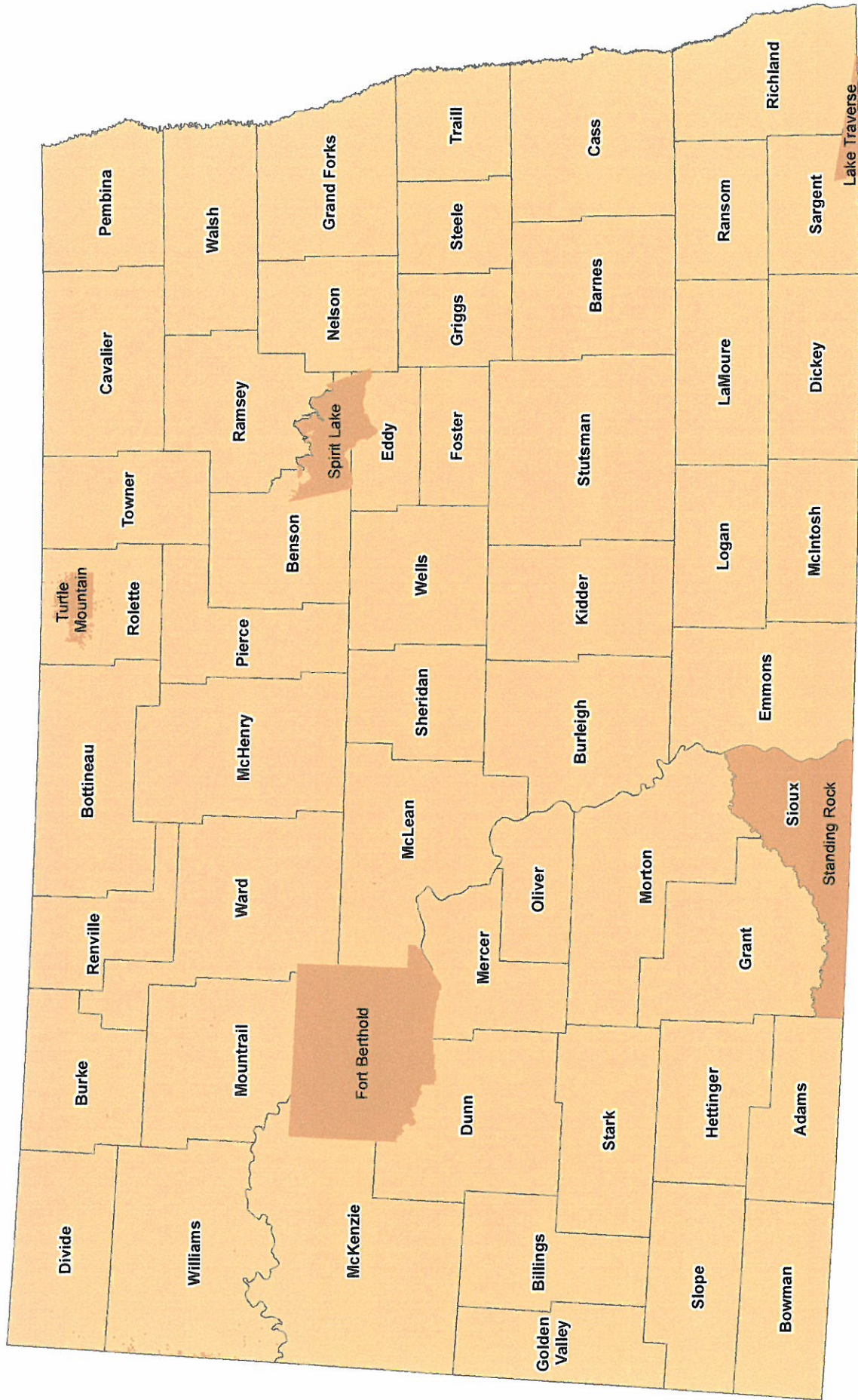


Figure 2
Percent White Population in North Dakota Counties

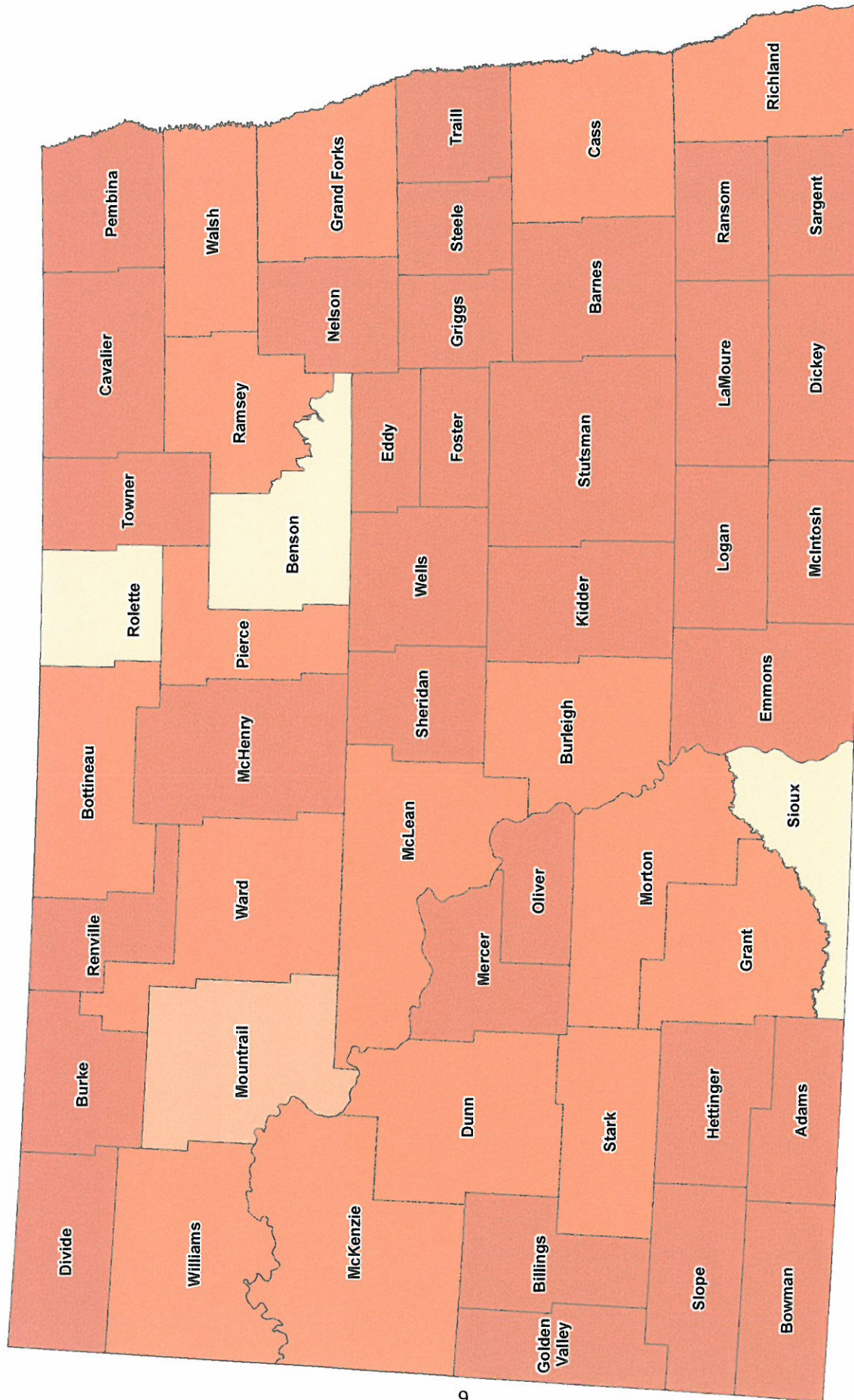
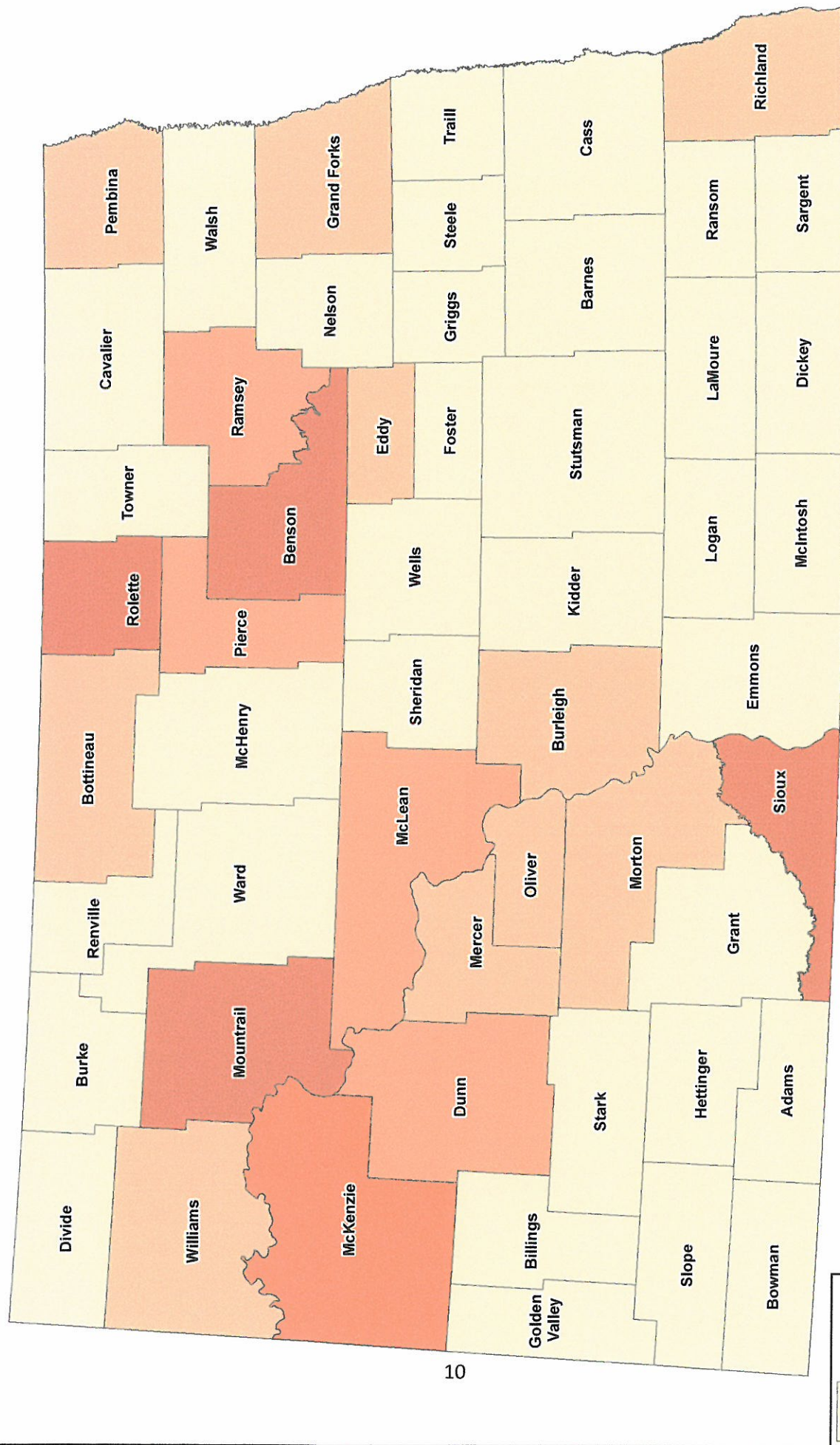


Figure 3
Percent Native American Population in North Dakota Counties



20. According to the 2006-2010 ACS, 5.4% of North Dakota household units had no access to a motor vehicle. (Notably, the statewide figure for 2009-2013 was 5.5%, only fractionally different from the earlier figure (See Appendix 2)). This variable pertains to occupied housing unit access to cars, vans, pickup trucks or panel trucks of one-ton capacity or less “kept at the home and available for the use of household members” (American Community Survey 2012: 41). While 10.5% of Native American household units did not have access to a motor vehicle 2006-2010, only 4.8% of White household units had no access to a motor vehicle 2006-2010 (Table 3). Thus, Native American households are twice as likely not to have access to a motor vehicle as White households.

21. The counties with the largest proportions of occupied households without access to motor vehicles are largely concentrated in two contiguous clusters of counties in the eastern half of the state with only a couple of exceptions (Figure 5). There are four counties in North Dakota that have 8% or more of their households without access to a motor vehicle: Sioux (12.5%), Benson (8.4%), Pierce (8.3%) and Rolette (8.2%). Sioux, Benson and Rolette have the highest proportions of Native American population in North Dakota.

Figure 4
Percent of Voting Age Population With Incomes Below the Poverty Rate in the Last 12 Months
at the County Level, 2009-2013

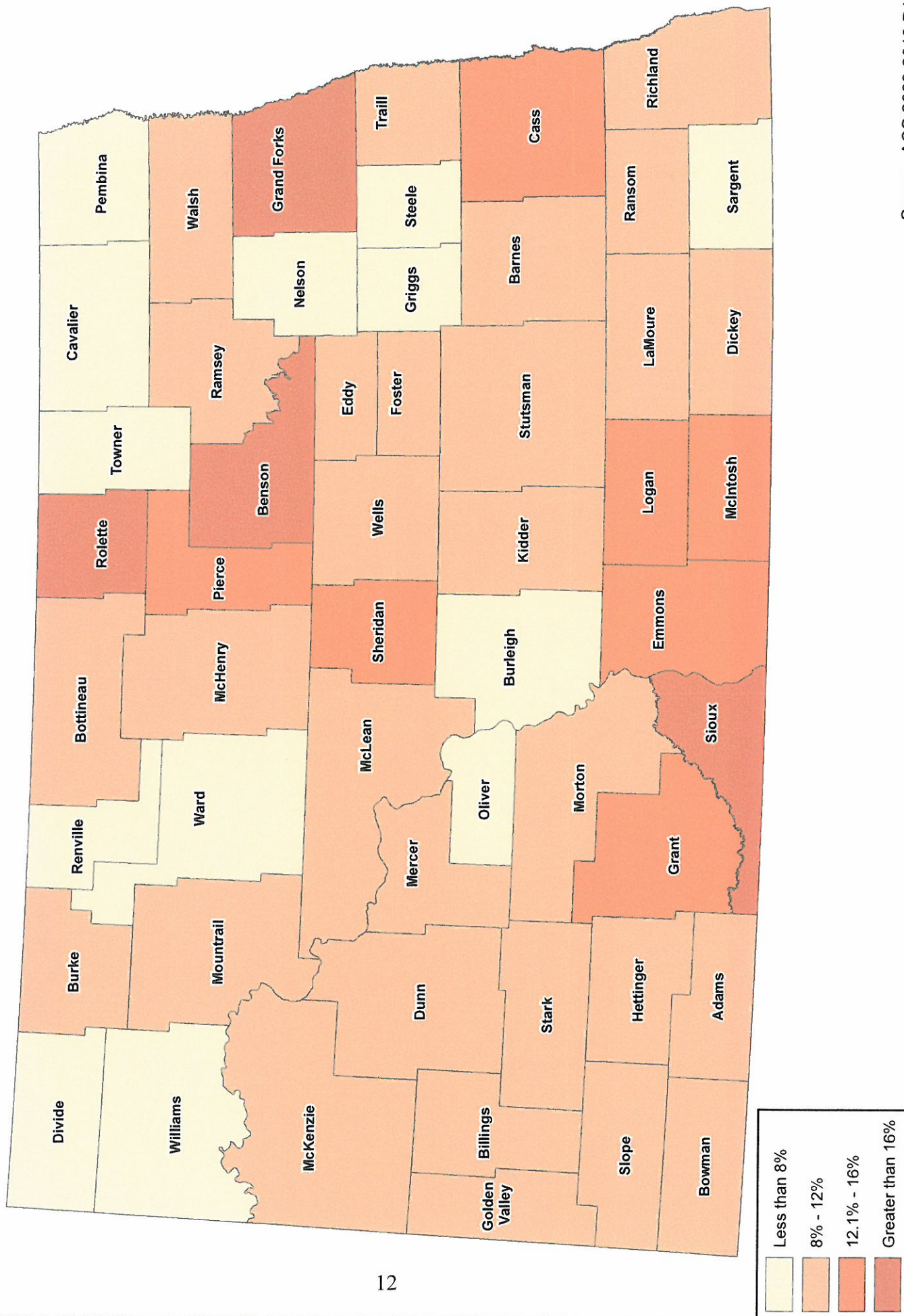
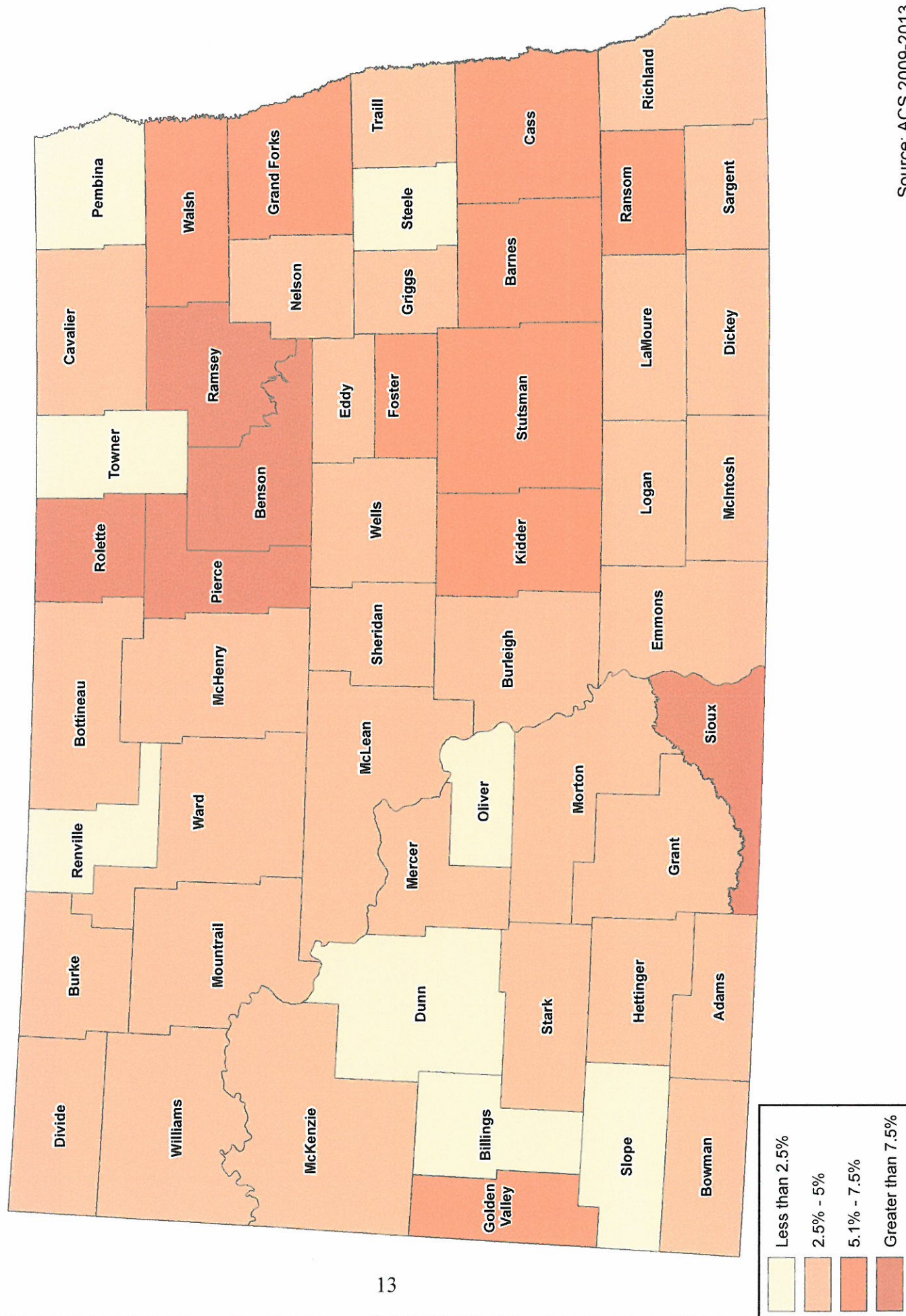


Figure 5
Percent of Occupied Housing Units With No Access to a Motor Vehicle at the County Level, 2009-2013



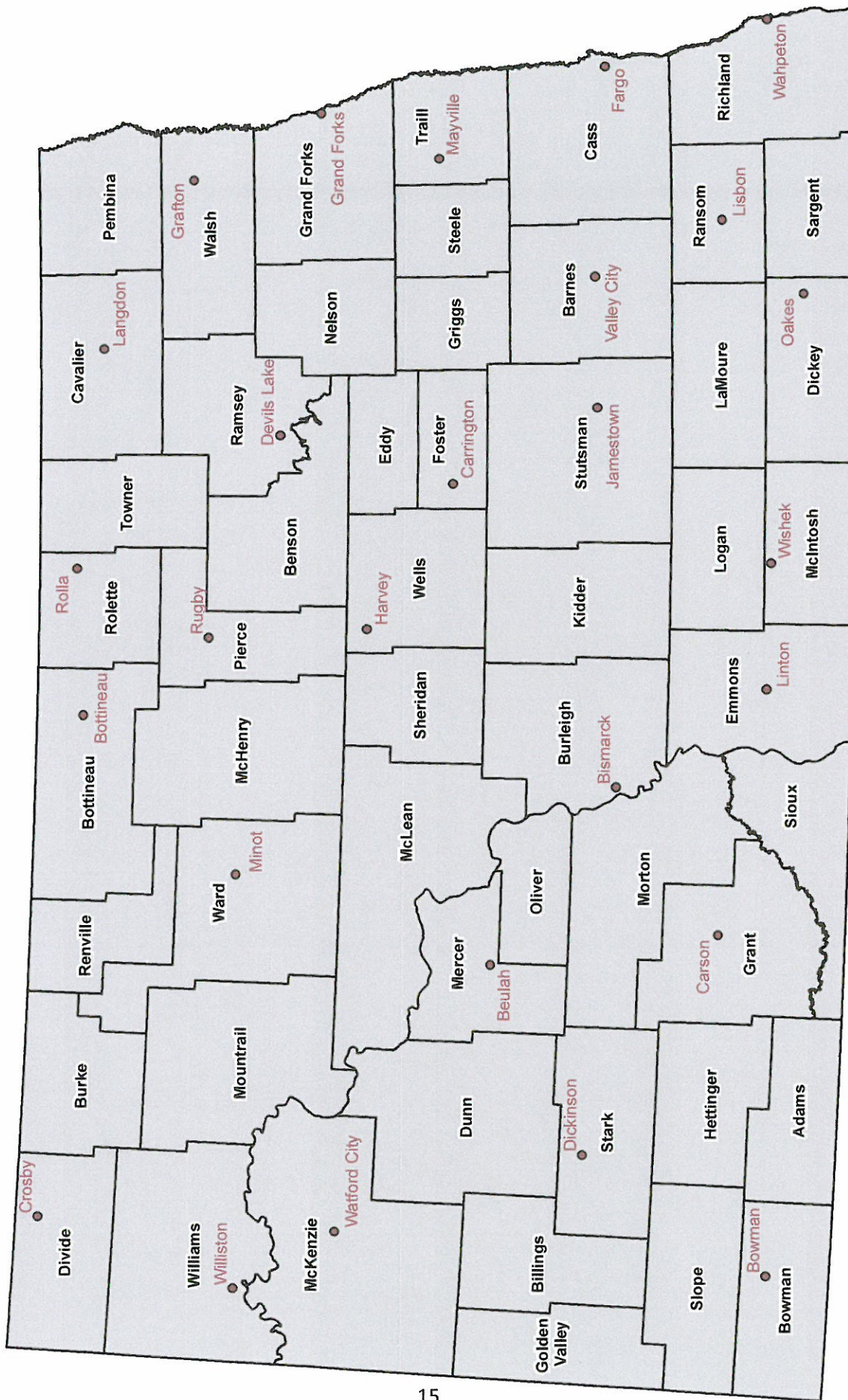
4. NORTH DAKOTA'S VOTER IDENTIFICATION REQUIREMENTS

22. The state of North Dakota requires specific forms of identification for in person voting (<https://vip.sos.nd.gov/idrequirements.aspx>). There are four acceptable forms of identification including 1) a North Dakota driver's license, 2) a North Dakota non-driver's identification card, 3) a Tribal government issued identification card, or 4) a long-term care identification certificate provided by a North Dakota facility. Acceptable forms of identification must have the potential voter's name, correct residential address and date of birth.

23. Applications for North Dakota driver's licenses or non-driver's identification cards can be made at a North Dakota Driver's License Site with proof of identification, proof of social security number and proof of a North Dakota residence (<http://www.dot.nd.gov/divisions/driverslicense/docs/proof-of-identification-documents.pdf>). The cost of securing a driver's license or non-driver's license identification ranges from \$8.00 to \$10.00 (<http://www.dot.nd.gov/divisions/driverslicense/dlrequirements.htm>).

24. In total there are 27 driver's license sites in North Dakota's 53 counties, approximately one site for every two counties, or one for every 2,600 square miles of the state's area (<https://www.dot.nd.gov/divisions/driverslicense/docs/Drivers%20Lic%20Sites.pdf>). The geographic distribution of these sites is displayed on Figure 6.

Figure 6
Locations Where North Dakotans Can Secure a Driver's License (September 2015)



25. The hours of operation are severely limited for a substantial majority of sites at which North Dakotans can apply for driver's licenses. Twelve are open less than six hours on one day a month or less. For example, the driver's license office in Crosby is open the second Wednesday every other month for four hours and forty minutes, or a total of 28 hours per year. Seven additional driver's license outlets are open two days a month, four others are open four days a week, and only four are open five days a week except on designated holidays (<https://www.dot.nd.gov/divisions/driverslicense/docs/Drivers%20Lic%20Sites.pdf>). Thus, there are a limited number of sites at which North Dakotans can apply for a driver's license, and their hours of operation are also limited, creating obstacles for those seeking identification appropriate for in-person voting.

26. Tribal government issued identification cards may also be used for the purpose of voting if they include the full name, residential address and birth date of the holder. The address requirement is problematic for many potential Native American voters. For example, most tribal members on the Spirit Lake Reservation use P.O. Box addresses (Lourens, 2016), and many tribal members on the Ft. Berthold Reservation either do not know their actual residential address or prefer to use a P.O. Box address (Taft, 2015). A tribal identification card without a residential address will not serve as acceptable identification for the purposes of in-person voting. Due to these limitations this report focuses on access to state Driver's License Sites where a potential voter can apply for either a driver's license or a non-driver's license.

5. OBSTACLES TO PARTICIPATION IN ELECTIONS

27. Participation in elections carries costs for voters, with greater costs generally leading to lower rates of participation. As stated by Anthony Downs in his classic 1957 book *An Economic Theory of Democracy*, “time is the principal cost of voting: time to register, to discover what parties are running, to deliberate, to go to the polls, and to mark the ballot. Since time is a scarce resource, voting is inherently costly” (p. 265). Downs goes on to state that the monetary costs associated with voting include the “cost of transportation” and that the “Ability to bear these costs varies inversely with income, so upper income citizens have an advantage. . . . If the time must be taken out of working hours, this cost can be quite high, in which case high-income groups again have an advantage” (p. 266). Thus, participation in the political system carries costs including time and/or money, and these higher costs can lead to higher rates of non-participation, particularly among lower-income citizens.

28. Also pertinent and parallel to Downs’ work are well established principles in geography pertaining to the effects of overcoming distance in terms of time and money. Of note is Edward Ullman’s classic 1954 article entitled *Geography as Spatial Interaction* (see also Lowe and Moryadas 1975: 21-23; Jackle, Brunn and Roseman 1976: chapter 5). Spatial interaction is the movement of a person or good from an origin to a destination. In the case of a potential voter who possesses the identification required in North Dakota to vote in person, the origin is his or her residence and the destination is the polling place. In the case of a potential voter who needs to obtain appropriate identification from a Driver’s License Site, an additional trip is required, with the origin being his or her residence and the destination a Driver’s License Site. Ullman concluded that spatial interaction will not occur if the time or monetary costs of overcoming distance are judged too great. With regard to voting, each potential voter determines

whether he or she has at their disposal the time and monetary resources needed to meet the costs associated with participating in the political process. The concept of distance decay establishes a direct decrease in the interaction between two places as the distance between them increases (Jackle, Brunn and Roseman 1976: 144-150). Thus, a voter living only a five-minute walk from a Driver's License Site location is more likely to obtain appropriate identification than one needing hours to travel to and from a Driver's License Site's location.

6. METHODS AND ANALYSIS

29. As noted above, the costs to secure an appropriate identification such as a driver's license to vote constitute an obstacle for potential voters to participate in the electoral system. The analysis included here therefore concentrates on travel time and distance to the nearest Driver's License Site for all Native Americans and Whites of voting age at the statewide level, and Native Americans at the reservation level. These calculations were completed with ArcGIS's Network Analyst extension using the distance from each census unit's (e.g., block, block group, tract) centroid (geographic center point) as calculated by the Census Bureau to the nearest Driver's License Site. Centroid calculations for census units or zip code areas are commonly used to examine geographic accessibility to public facilities or response times for emergency vehicles (e.g., Talen, E. and Anselin, L. 1998). The ArcGIS Network Analyst extension software searches for the nearest street, road or highway to the centroid of the census unit and calculates the distance in miles to the nearest Driver's License Site. The Network Analyst extension was also used to calculate the estimated motor vehicle travel time from the centroid of the census units to the nearest Driver's License Site.

30. As noted above, different releases of census data provide different variables. The intent here was to consider the travel distance and time for all Native Americans and Whites of voting age to a Driver's License Site at the block group level based on the ACS Five Year Estimates. The use of block groups instead of tracts may in some cases increase accuracy by reducing the likelihood of aggregation error in this type of analysis (Hewko, Smoyer-Tomic and Hodgson 2002). This proved impossible because while data for the number of Native Americans and Whites is available at the block group level, it is not broken down by age to determine the voting age population. As a result, the distances and times to the nearest Driver's License Site were calculated for the total Native American and total White population at the block group level as the first stage of the statewide analysis. There are 572 block groups in North Dakota.

31. Due to the limitations associated with the block group data, the second stage of the statewide analysis focused on census tracts. There are 205 census tracts in North Dakota and data on the number of Native Americans and Whites of voting age is available. As a result, the analysis was repeated at the tract level and the results of both analyses are provided in Table 4.

32. The results of the analysis at the block group level for all Native Americans and all Whites in North Dakota and the analysis at the tract level focusing on Native Americans and Whites of voting age were nearly identical. This indicates that aggregation error was not a problem when using the tract level data for the voting age population.

33. The average Native American of voting age needing to secure a driver's license or non-driver's license identification card for in person voting would have to travel 19.65 miles while the distance for the average White North Dakotan to do the same is 11.05 miles. Thus, the distance for Native Americans to travel to the nearest Driver's License Site is 1.8 times further than for White North Dakotans.

34. The average time needed for North Dakotan Native Americans of voting age to travel to a Driver's License Site was estimated to be 35.76 minutes, while the time needed for North Dakotan Whites to travel to a Driver's License Site is estimated at 18.94 minutes. Thus, the time needed for Native Americans of voting age to travel to a Driver's License Site is over 1.9 times longer than for White North Dakotans of voting age.

Table 4
Mean Travel Distances and Times for Native Americans and Whites in North Dakota to a Driver's License Site (DLS)

	Statewide Mean Native American Distance to DLS	Statewide Mean White Distance to DLS	Statewide Mean Native American Time to DLS	Statewide Mean White Time to DLS
Total Population (Block Groups)	19.75 miles	10.99 miles	35.17 minutes	18.92 minutes
Voting Age Population (Tracts)	19.65 miles	11.05 miles	35.76 minutes	18.94 minutes

SOURCE: Calculated by the University of Alabama Cartographic Research Laboratory.

35. A final focus of this analysis pertained to Native Americans living on one of the five reservations in North Dakota. Thus, do Native Americans living on reservations in North Dakota face increased obstacles for travel to sites where driver's licenses are issued when compared to potential voters statewide?

36. The 2010 census of population counted 36,591 Native Americans in North Dakota (Table 1). Of this total, 55% or 19,970 resided on one of the five reservations in North Dakota (Table 5). By far the largest number of Native Americans resided on the Turtle Mountain Reservation at 8,319 individuals. The smallest Native American population of the five

reservations is on the portion of the Lake Traverse Reservation in North Dakota which includes only eight individuals.

37. There are also great contrasts in the numbers of voting age Native Americans on the five reservations. While there are 5,172 Native Americans of voting age on the Turtle Mountain Reservation in north central North Dakota, only six Native Americans of voting age reside on that portion of the Lake Traverse Reservation in North Dakota (Table 5).

Table 5
Total and Voting Age Native American Populations Residing on Reservations
in North Dakota, 2010

Reservation	Total Native American Population	Total Voting Age Native American Population
Ft. Berthold	4,556	2,883
Turtle Mountain	8,319	5,172
Spirit Lake	3,595	1,983
Standing Rock	3,492	2,136
Lake Traverse	8	6
TOTAL	19,970	12,180

SOURCE: Census of Population, 2010.

38. Parallel to the earlier calculation of travel distances and times for Native Americans and Whites to access a driver's license site, this analysis focused on all Native Americans of voting age residing on the five reservations with land area in North Dakota. Because tract and block group census unit boundaries do not necessarily follow reservation boundaries, this analysis used 2010 block level data to insure that the reservation boundaries were conterminous with the census unit boundaries. The centroids of each census block as calculated by the U.S. Census Bureau were used to estimate the average travel distances and

times to a Driver's License Site for all Native Americans 18 years old and older residing on the five reservations with land area in North Dakota.

Table 6
Mean Travel Distances and Times for Native Americans Residing on
Reservations in North Dakota to Travel to a Driver's License Site (DLS)

Reservation	Mean Travel Distance for Voting Age Native Americans	Mean Travel Time for Voting Age Native Americans
Ft. Berthold	49.6 miles	84.6 minutes
Turtle Mountain	11.0 miles	17.4 minutes
Spirit Lake	14.0 miles	25.3 minutes
Standing Rock	60.8 miles	106.62 minutes
Lake Traverse	40.1 miles	64.3 minutes
All Reservations	29.4 miles	50.3 minutes

SOURCE: Calculated by the University of Alabama Cartographic Research Laboratory.

39. As noted above, 55 percent of North Dakota Native Americans reside on one of the five reservations with geographic area in the state. On average, Native Americans of voting age residing on reservations in North Dakota must travel over 29 miles to visit a Driver's License Site which is greater than the statewide estimates for both Whites (11 miles) or Native Americans (20 miles) (Table 6). Thus, voting age Native Americans living on reservations in North Dakota face great obstacles in securing a driver's license or non-driver's license at a state Driver's License Site. Notably, there are significant contrasts in travel distances and times to Driver's License Site for different reservations. While a potential Native American voter on the Turtle Rock Reservation would need to travel 11 miles to a Driver's License Site, the comparable estimate for potential voters on the Standing Rock Reservation is nearly 61 miles, and the comparable distance for potential Native American voters on the Ft. Berthold reservation

is nearly 50 miles. Long distances can constitute a substantial obstacle to participation by potential Native American voters who also suffer from greater rates of poverty and more limited access to motor vehicles.

7. CONCLUSIONS

40. Participation in the political system such as voting has costs in terms of time and money. The time required to travel to and from a Driver's License Site can pose significant obstacles and include significant costs to a potential voter attempting to obtain a driver's license or non-driver's identification card. These burdens fall most heavily on potential voters who lack access to a motor vehicle for travel, and have incomes below the poverty level that limit their options. As a result, potential Native American voters will face more obstacles to cast ballots than White voters due to their higher rates of poverty and more limited household access to motor vehicles.

41. Statewide, potential Native American voters must travel nearly twice the distance to reach a Driver's License Site as potential White voters. For those potential Native American voters living on the state's reservations, the mean travel distances and times are even greater. For a voting age Native American on the Standing Rock Reservation the mean distance to a Driver's License Site is nearly 61 miles, while the mean distance is nearly 50 miles for a voting age Native American on the Ft. Berthold Reservation. These distances constitute significant obstacles to Native American participation in the political system through voting.

REFERENCES

- American Community Survey 2012. *American Community Survey and Puerto Rico Community Survey 2012 Subject Definitions*.
http://www.census.gov/acs/www/Downloads/data_documentation/SubjectDefinitions/2012_ACSS_subjectDefinitions.pdf
- Downs, Anthony. 1957. *An Economic Theory of Democracy*, New York: Harper and Brothers.
- Hewko, J., Smoyer-Tomie, K. and Hodgson, M.J. 2002. "Measuring Neighborhood Spatial Accessibility to Urban Amenities: Does Aggregation Error Matter?," *Environment and Planning A*, Vol. 34: 1185-1206.
- Jackle, J.A., Brunn S. and Roseman, C.C. 1985. *Human Spatial Behavior: A Social Geography*. Prospect Heights, IL: Waveland Press.
- Lourens, Laurie. 2016. Director of the DMV, Spirit Lake Nation, Spirit Lake Reservation, Personal Phone Communication, 1/21/16.
- Morriyadas, L. 1975. *The Geography of Movement*. Boston: Houghton Mifflin.
- Taft, Sevant. 2015. Enrollment Direction, MHA Nation, Fort Berthold Reservation, Personal Email Communication, 11/3/15.
- Talen, E. and Anselin, L. 1998. "Assessing Spatial Equity: An Evaluation of Measures of Accessibility to Public Playgrounds," *Environment and Planning A*, 30: 595-613.
- Ullman, Edward. 1954. "Geography as Spatial Interaction," In *Interregional Linkages, Proceedings of the Western Committee on Regional Economic Analysis of the Social Science Research Council*, D. Revzan and E. Englebert, Eds., pp. 1-12. Berkeley, CA.
- U.S. Census Bureau, 2008. *A Compass for Understanding and Using American Community Survey Data: What General Data Users Need to Know*, Washington, D.C.: U.S. Government Printing Office.

Appendix 1 – Vita

Appendix 2 – Variable Tables